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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DOUGLAS, JOHN CHRISTOPHER

ART UNIT PAPER NUMBER

1764

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/644,121

Applicant(s)

ZINNEN ET AL.

Examiner

John C. Douglas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/20/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/20/03 + 12/29/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 7 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Claims 7 and 8 recites the limitation "the oxidizing agent" in claims 1 and 6, which can be a solid, liquid, or a gas, such as oxygen and ozone. Claim 1 refers to an aqueous oxidizing solution, which describes a liquid. There is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Kocal (US 6277271).
3. With regard to claim 1, Kocal discloses a desulfurization process comprising contacting hydrocarbon oil with a hydrodesulfurization catalyst at hydrodesulfurization

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conditions to produce hydrogen sulfide and a first hydrocarbon stream having a reduced sulfur concentration (see Kocal, column 9, lines 4-10), contacting the first hydrocarbon stream with an aqueous oxidizing solution to produce a second hydrocarbon stream comprising sulfur-oxidated compounds (see Kocal, column 10, lines 5-10), contacting the second hydrocarbon stream with an adsorbent to produce a third hydrocarbon stream having a reduced concentration of sulfur-oxidated compounds and separating the hydrocarbon from the adsorbed sulfur oxidated compounds (see Kocal, column 9, lines 20-24 and 59-61 and column 8, lines 53-58), and recovering the third hydrocarbon stream (see Kocal, column 9, lines 28-29).

4. With regard to claim 2, Kocal discloses where the hydrocarbonaceous oil boils in the range from about 149 to about 538 degrees C (see Kocal, claim 2).

5. With regard to claim 3, Kocal discloses where the hydrodesulfurization is operated under a pressure from about 100 psig to about 1800 psig, maximum catalyst temperature from about 204 to about 400 degrees C and a hydrogen to feed ratio from about 200 to about 10000 SCFB (see Kocal, claim 3).

6. With regard to claim 4, Kocal discloses where the hydrodesulfurization catalyst comprises a Group VIB metal component, a Group VIII metal component and alumina (see Kocal, claim 4).

7. With regard to claim 5, Kocal discloses where the hydrocarbonaceous oil stream has a reduced concentration of sulfur and produced in step (a) has a sulfur level from about 100ppm to about 1000ppm (see Kocal, claim 5).

8. With regard to claim 6, Kocal discloses where the sulfur-oxidated compounds are selected from the group consisting of sulfoxide and sulfones (see Kocal, claim 6).
9. With regard to claim 7, Kocal discloses where the oxidizing agent is selected from the group consisting of a gas, a liquid and a solid (see Kocal, claim 7).
10. With regard to claim 8, Kocal discloses where the oxidizing agent is selected from the group consisting of oxygen, ozone, nitrogen oxide, hydrogen peroxide, organic hydroperoxide, carboxylic peracids and metal superoxides (see Kocal, claim 8).
11. With regard to claim 9, Kocal disclose where the oxidation zone contains an oxidation catalyst (see Kocal, claim 9).
12. With regard to claim 10, Kocal discloses decomposing at least a portion or the residual oxidizing solution (see Kocal, column 9, lines 18-19).
13. With regard to claim 11, Kocal discloses where the decomposition is conducted in the presence of a catalyst (see Kocal, claim 11).
14. With regard to claim 12, Kocal discloses where the aqueous oxidizing solution comprises hydrogen peroxide and a carboxylic acid (see Kocal, claim 17).
15. With regard to claim 13, Kocal discloses where the oxidation zone is operated at conditions including a molar feed ratio of hydrogen peroxide to sulfur ranging from about 1 to about 10 and a molar ratio of carboxylic acid to hydrogen peroxide from about 0.1 to about 10 (see Kocal, claim 18).
16. With regard to claim 14, Kocal discloses where the oxidation zone is operated at conditions including a pressure from about atmospheric to about 100 psig and a temperature from about 100 to about 300 degrees F (see Kocal, claim 19).

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17. With regard to claim 15, Kocal discloses where the adsorbent is silica or alumina (see Kocal, column 6, lines 63-65).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

21. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kocal in view of Savage (US 5454933). Kocal discloses everything in claim 1 (see paragraph 3), but does not disclose where the contacting step is selected from the group consisting of fixed bed, ebullated bed, fluidized bed, or other counter current solid-liquid contacting.

However, Savage discloses moving or fixed bed vessels in the adsorption zone (see Savage, column 3, lines 54-57).

Savage discloses that the product stream leaving the adsorption zone is substantially free of all sulfur compounds (see Savage, column 3, lines 54-57).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kocal to include moving or fixed bed vessels in the adsorption zone in order that the product stream leaving the adsorption zone is substantially free of all sulfur compounds.

22. Claims 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kocal in view of Savage.

23. With regard to claim 17, Kocal discloses a desulfurization process comprising contacting hydrocarbon oil with a hydrodesulfurization catalyst at hydrodesulfurization conditions to produce hydrogen sulfide and a first hydrocarbon stream having a reduced sulfur concentration (see Kocal, column 9, lines 4-10), contacting the first hydrocarbon stream with an aqueous oxidizing solution to produce a second hydrocarbon stream comprising sulfur-oxidated compounds (see Kocal, column 10, lines 5-10), contacting the second hydrocarbon stream with an adsorbent to produce a third hydrocarbon stream having a reduced concentration of sulfur-oxidated compounds and separating

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the hydrocarbon from the adsorbed sulfur oxidated compounds (see Kocal, column 9, lines 20-24 and 59-61 and column 8, lines 53-58), and recovering the third hydrocarbon stream (see Kocal, column 9, lines 28-29). Kocal does not disclose regenerating at least a portion of the adsorbent and recycling the regenerated adsorbent to the adsorption zone to provide at least a portion of the selective adsorbent.

However, Savage discloses regenerating the adsorbent (see Savage, column 3, lines 58-59).

Savage regenerates the adsorbent so that it again can be used in the adsorption process (see Savage, column 6, lines 20-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kocal to include regenerating the adsorbent in order that the adsorbent can be used again in the adsorption process.

24. With regard to claim 18, Kocal discloses where the oxidizing agent is selected from the group consisting of oxygen, ozone, nitrogen oxide, hydrogen peroxide, organic hydroperoxide, carboxylic peracids and metal superoxides (see Kocal, claim 8).

25. With regard to claim 19, Kocal discloses where the hydrodesulfurization is operated under a pressure from about 100 psig to about 1800 psig, maximum catalyst temperature from about 204 to about 400 degrees C and a hydrogen to feed ratio from about 200 to about 10000 SCFB (see Kocal, claim 3).

26. With regard to claim 20, Kocal discloses where the aqueous oxidizing solution comprises hydrogen peroxide and a carboxylic acid (see Kocal, claim 17).

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27. With regard to claim 21, Kocal discloses where the oxidation zone is operated at conditions including a molar feed ratio of hydrogen peroxide to sulfur ranging from about 1 to about 10 and a molar ratio of carboxylic acid to hydrogen peroxide from about 0.1 to about 10 (see Kocal, claim 18).

28. With regard to claim 22, Kocal discloses where the oxidation zone is operated at conditions including a molar feed ratio of hydrogen peroxide to sulfur ranging from about 1 to about 10 and a molar ratio of carboxylic acid to hydrogen peroxide from about 0.1 to about 10 (see Kocal, claim 18).

29. With regard to claim 23, Kocal discloses a desulfurization process comprising contacting hydrocarbon oil where the hydrocarbonaceous oil boils in the range from about 149 to about 538 degrees C (see Kocal, claim 2) with a hydrodesulfurization catalyst at hydrodesulfurization conditions which include a pressure from about 100 psig to about 1800 psig, maximum catalyst temperature from about 204 to about 400 degrees C and a hydrogen to feed ratio from about 200 to about 10000 SCFB (see Kocal, claim 3) to produce hydrogen sulfide and a first hydrocarbon stream having a reduced sulfur concentration (see Kocal, column 9, lines 4-10), contacting the first hydrocarbon stream with an aqueous oxidizing solution comprising hydrogen peroxide and a acetic acid (see Kocal, column 6, lines 7-9) to produce a second hydrocarbon stream comprising sulfur-oxidated compounds (see Kocal, column 10, lines 5-10), contacting the second hydrocarbon stream with an adsorbent where the adsorbent is silica or alumina (see Kocal, column 6, lines 63-65) to produce a third hydrocarbon stream having a reduced concentration of sulfur-oxidated compounds and separating

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the hydrocarbon from the adsorbed sulfur oxidated compounds (see Kocal, column 9, lines 20-24 and 59-61 and column 8, lines 53-58), and recovering the third hydrocarbon stream (see Kocal, column 9, lines 28-29). Kocal does not disclose regenerating at least a portion of the adsorbent and recycling the regenerated adsorbent to the adsorption zone to provide at least a portion of the selective adsorbent.

However, Savage discloses regenerating the adsorbent (see Savage, column 3, lines 58-59).

Savage regenerates the adsorbent so that it again can be used in the adsorption process (see Savage, column 6, lines 20-23).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Kocal to include regenerating the adsorbent in order that the adsorbent can be used again in the adsorption process.

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Johnson (US 4719007).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

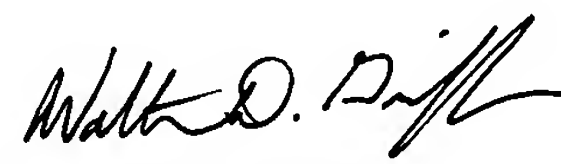
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCD


Walter D. Griffin
Primary Examiner